

ABSTRACT

A near-field optical apparatus having one or more solid state lasers and an
5 aerodynamically shaped slider which comprise a single integrated, monolithic
device fabricated from the same base semiconductor material. The monolithic
optical head can be quickly and easily attached to the read arm of an optical
read/write device without requiring attachment of separate laser elements, and
without micropositioning or use of optical microscopy for positioning the lasers.
10 The optical head comprising a single semiconductor substrate including a first
region which defines a slider having an air bearing surface, and at least one
second, laser region which defines a diode laser, with the diode laser having an
emission face which is substantially co-planar with the air bearing surface. The
semiconductor substrate preferably includes an active layer, a p-clad layer or
15 reflective layer adjacent a first side of the active region, an n-clad layer or
reflective layer adjacent a second side of the active layer, and an n-
semiconductor layer adjacent the n-clad layer. A slider region of the
semiconductor substrate includes an air bearing surface, adjacent the p-clad
layer, which is aerodynamically structured and configured to define a slider. The
20 integral lasers include a p-electrical contact adjacent to the p-clad layer and

proximate to the laser emission face, and an n-electrical contact adjacent to the n-clad layer or an n-semiconductor layer. The laser mode is defined by oxidized or ion-diffusion regions associated with the p-clad layer or n-clad layer of the laser. A conductive via through the substrate allows electrical connection with the p-side contact to be achieved from the n-side of the substrate. The optical head is used in a near-field optical system with an optical medium having a phase change layer.

00495552-020100